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UPGRADES TO THE LLNL FLASH X-RAY INDUCTION LINEAR ACCELERATOR (FXR)

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The FXR is an induction linear accelerator used for flash radiography at the Lawrence Livermore National Laboratory's Site 300 Test Facility. The FXR was originally completed in 1982 and has been in continuous use as a radiographic tool. At that time the FXR produced a 17 MeV, 2.2 kA burst of electrons for a duration of 65 ns.

An upgrade of the FXR was recently completed. The purpose of this upgrade was to improve the performance of the FXR by increasing the energy of the electron injector from 1.2 MeV to 2.5 MeV and the beam current from 2.2 kA to 3 kA, improving the magnetic transport system by redesigning the solenoidal transport focus coils, reducing the rf coupling of the electron beam to the accelerator cells, and by adding additional beam diagnostics. The FXR now operates at up to 18 MeV with a beam current of 2.2 kA - 3 kA.

We will describe the injector upgrades and performance, as well as our efforts to tune the accelerator by minimizing beam corkscrew motion and the impact of Beam Breakup Instability on beam centroid motion throughout the beamline as the current is increased to 3 kA.

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